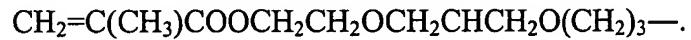


WHAT IS CLAIMED:

- 1        1. A process for producing a silane-crosslinked thermoplastic polymer
- 2        comprising:
  - 3            a) providing a mixture of:
    - 4                    (i) at least one silane possessing an unsaturated organic function;
    - 5                    (ii) at least two free radical initiators, the first initiator having a first half-life temperature and the second initiator having a second half-life temperature being higher than said first half-life temperature;
    - 6                    (iii) at least one thermoplastic polymer; and,
  - 7            b) reacting the mixture of step (a) under reactive mechanical-working
  - 8            conditions and exposure to moisture to provide crosslinked polyolefin.
- 1        2. The process of Claim 1 wherein the thermoplastic polymer is at least one polyolefin selected from the group consisting of high-pressure low-density polyethylene, medium/low-pressure high-density polyethylene, low-pressure low-density polyethylene, medium-density polyethylene, an ethylene- $\alpha$ -olefin copolymer, polypropylene, an ethylene-ethyl acrylate copolymer, an ethylene-vinyl acetate copolymer, an ethylene-propylene copolymer, an ethylene-propylene-diene terpolymer, an ethylene-butene copolymer, polymethyl-pentene-1, polybutene, chlorinated polyethylene, an ethylene-vinyl acetate-chlorine terpolymer, and the like, and mixtures thereof.

1           3.       The process of Claim 1 wherein the silane possesses the general formula  
2       RR'SiY<sub>2</sub> wherein R represents a monovalently olefinically unsaturated hydrocarbon or  
3       hydrocarbonoxy radical, each Y represents a hydrolysable organic radical and R  
4       represents an R radical or a Y radical.

1                  4.        The process of Claim 3 wherein the R radical or the Y radical is selected  
2                  from the group consisting of vinyl, allyl, butenyl, cyclohexenyl, cyclopentadienyl,  
3                  cyclohexadienyl,



1           5.       The process of Claim 3 wherein the group Y represents a hydrolysable  
2        organic radical selected from the group consisting of alkoxy radicals, acyloxy radicals,  
3        oximato radicals and amino radicals.

1                   6.        The process of Claim 3 wherein the silane is vinyl triethoxysilane and/or  
2        vinyl trimethoxysilane.

1                   7.        The process of Claim 1 wherein the 0.1 hour half-life temperatures  
2        of the first free radical initiator is from about 80° to about 160°C.

1           8.     The process of Claim 1 wherein the 0.1 hour half-life temperatures  
2     of the first free radical initiator is from about 90° to about 155°C.

1           9.     The process of Claim 1 wherein the 0.1 hour half-life temperature  
2     of the second free radical initiator is from about 125° to about 190°C.

1           10.    The process of Claim 1 wherein the 0.1 hour half-life temperature  
2     of the second free radical initiator is from about 140° to about 170°C.

1           11.    The process of Claim 7 wherein the first free radical initiator is selected  
2     from the group consisting of di (2,4-dichloro benzoyl) peroxide, tert-butyl  
3     peroxypivalate, dilauroyl peroxide, dibenzoyl peroxide, tert-butyl peroxy-2-  
4     ethylhexanoate, 1,1 di(tertbutylperoxy)-3,3,5-trimethylcyclohexane, di(tertbutylperoxy)  
5     cyclohexane, tert-butyl peroxy-3,5,5-trimethylhexanoate, tert-butyl peroxyacetate, tert-  
6     butylperoxybenzoate, di-tert-amyl peroxide, dicumyl peroxide, di(tert-  
7     butylperoxyisopropyl)benzene and 2,5-dimethyl-2,5-di(tert-butylperoxy)hexane.

1           12.    The process of Claim 9 wherein the second free radical initiator is selected  
2     from the group consisting of tert-butyl peroxyacetate, tert-butylperoxybenzoate, di-tert-  
3     amyl peroxide, dicumyl peroxide, di(tert-butylperoxyisopropyl)benzene, 2,5-dimethyl-  
4     2,5-di(tert-butylperoxy)hexane, tert-butyl cumyl peroxide, 2,5-dimethyl-2,5-di(tert-  
5     butylperoxy)hexyne-3 and di-tertbutylperoxide.

- 1        13.    The process of Claim 1 wherein mixture (a) further includes at least one
- 2        additional component selected from the group consisting of catalysts, stabilizers, fillers,
- 3        antioxidants, processing aids, oils, plasticizers, pigments and lubricants.
- 1        14.    The crosslinked polyethylene produced by the process of Claim 1.
- 1        15.    The crosslinked polyethylene produced by the process of Claim 2.
- 1        16.    The crosslinked polyethylene produced by the process of Claim 3.
- 1        17.    The crosslinked polyethylene produced by the process of Claim 4.
- 1        18.    The crosslinked polyethylene produced by the process of Claim 5.
- 1        19.    The crosslinked polyethylene produced by the process of Claim 6.
- 1        20.    The crosslinked polyethylene produced by the process of Claim 7.
- 1        21.    The crosslinked polyethylene produced by the process of Claim 8.
- 1        22.    The crosslinked polyethylene produced by the process of Claim 9.

1           23. The crosslinked polyethylene produced by the process of Claim 10.

1           24. The crosslinked polyethylene produced by the process of Claim 11.

1           25. The crosslinked polyethylene produced by the process of Claim 12.

1           26. The crosslinked polyethylene produced by the process of Claim 13.

1           27. A composition comprising:

2                   (i) at least one silane possessing an unsaturated organic function;

3                   (ii) at least two free radical initiators, the first initiator having a first

4                   half-life temperature and the second initiator having a second half-life temperature, said

5                   second half-life temperature being higher than said first half-life temperature;

6                   (iii) optionally one or more condensation catalysts;

7                   (iv) optionally, one or more stabilizers, stabilizer packages, inhibitors

8                   or free radical scavengers; and,

9                   (v) optionally, other additives such as fillers, colorants, processing

10                  aids, etc.